

## CLAIMS

1. A constant-voltage circuit for  
5 converting an input voltage provided to an input terminal of said constant-voltage circuit into a predetermined constant voltage, and for providing said constant voltage to a load, comprising:
- a reference voltage generating circuit  
10 unit for generating and outputting a predetermined reference voltage;
  - an output voltage detecting unit for detecting said constant voltage, and generating and outputting a voltage that is proportional to said  
15 detected voltage;
  - an output transistor for outputting a current provided from said input terminal to said load according to a control signal;
  - an error amplifying circuit unit for  
20 providing said control signal for controlling operations of said output transistor so that said proportional voltage becomes equal to said reference voltage;
  - an output current detecting unit for  
25 detecting said current output from said output

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transistor, and generating and outputting a proportional current that is proportional to the detected current;

5 a first resistance connected to said output voltage detecting unit;

a proportional current supply circuit unit for supplying said proportional current, which is proportional to the output current, from said output current detecting unit to said first resistance;

10 a second resistance connected between said output transistor and said load; and

a capacitor connected to a junction where said second resistance and said load are connected; wherein said second resistance and said capacitor  
15 constitute a phase compensating circuit unit for carrying out phase compensation for said error amplifying circuit unit.

2. The constant-voltage circuit as claimed  
20 in claim 1, wherein a resistance value of said first resistance is set such that a product of the resistance value and said proportional current provided by said output current detecting unit becomes equal to or less than a voltage drop through  
25 said second resistance.

3. The constant-voltage circuit as claimed in claim 1, wherein said output current detecting unit comprises a transistor for output current  
5 detection for outputting said proportional current that is proportional to the current output from said output transistor according to the control signal from said error amplifying circuit unit using a current provided to said input terminal.

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4. The constant-voltage circuit as claimed in claim 3, wherein said proportional current supply circuit unit comprises a current mirror circuit, to which the current output from the said transistor  
15 for output current detection is provided.

5. The constant-voltage circuit as claimed in claim 4, wherein said proportional current supply circuit unit comprises a stack type current mirror  
20 circuit.

6. The constant-voltage circuit as claimed in claim 4, wherein said proportional current supply circuit unit comprises two current mirror circuits  
25 that are cascaded.

7. The constant-voltage circuit as claimed  
in claim 4, wherein said proportional current supply  
circuit unit comprises a Wilson type current mirror  
5 circuit.

8. The constant-voltage circuit as claimed  
in claim 4, wherein said proportional current supply  
circuit unit comprises:

10 an operation amplifying circuit, wherein  
the output of said output transistor is provided to  
one of input terminals of the operation amplifying  
circuit, and the output of said transistor for  
output current detection is provided to another  
15 input terminal of the operation amplifying circuit;

a current control transistor for  
controlling the current output from said transistor  
for output current detection according to an output  
of said operation amplifying circuit, and for  
20 outputting a control current; and

a current mirror circuit that inputs said  
control current output by said current control  
transistor, and for outputting a current  
proportional to said control current to said first  
25 resistance.

9. The constant-voltage circuit as claimed in claim 1, wherein an internal resistance of said capacitor is small.

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10. The constant-voltage circuit as claimed in claim 7, wherein said capacitor is a ceramic capacitor.

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11. The constant-voltage circuit as claimed in claim 1, wherein a resistance value of said second resistance is between 50 m $\Omega$  and 10  $\Omega$ .

12. The constant-voltage circuit as claimed in claim 1, wherein said second resistance is formed by wiring resistance.

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13. The constant-voltage circuit as claimed in claim 1, wherein said reference voltage generating circuit unit, the output voltage detecting unit, the output transistor, the error amplifying circuit unit, the output current detecting unit, the first resistance, and the proportional current supply circuit unit are integrated as an IC.

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14. The constant-voltage circuit as  
claimed in claim 1, wherein said reference voltage  
generating circuit unit, the output voltage  
5 detecting unit, the output transistor, the error  
amplifying circuit unit, the output current  
detecting unit, the first resistance, the  
proportional current supply circuit unit, and the  
second resistance are integrated as an IC.

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15. The constant-voltage circuit as  
claimed in claims 1, wherein said first resistance  
is connected between said output transistor and said  
output voltage detecting unit.

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